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A NEW VARARIA FROM WESTERN NORTH AMERICA

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Collecting in Alberta in 1964 and 1966 and in Arizona in 1967 has yielded a number of interesting wood-rotting fungi not previously reported from western North America. One of these is a striking species of *Vararia* P. Karst. (Basidiomycetes-Thelephoraceae s.l.) described as new in this paper.

Vararia athabascensis Gilbertson, sp. nov. Fructification effusa, ochracea vel incarnata, 30–350 μ crassa; hyphae nodoso-septatae, 2–3.5 μ diam; dichohyphidia abundanta, 1–3 μ diam, tunicus densus, dextrinoideus; gloeocystidia abundanta, tenitunicata, sinuoso-constricta vel cylindracea, 3–10 μ diam; basidia cylindracea-clavata, 30–40 \times 6–6.5 μ , 4-sterigmatibus; basidiosporae tenuitunicatae, laeves, hyalinae, subclavatae, subarcutatae, non-amyloideae, 11–16 \times 3–5 μ .

Type. Canada, Alberta. Along Athabasca River, Jasper National Park, on *Pinus contorta* Dougl., *Gilbertson 4752*, July 21, 1964 (BPI-holotype).

Basidiocarps annual, effused in small patches up to 10 cm long, 30–350 μ thick, not readily separable; margin not differentiated, abrupt to thinning out; hymenial surface Pale Ochraceous-Buff to Pinkish-Buff when fresh and on drying, cracking on drying, finely tomentose under a 30x lens; subiculum concolorous with hymenial surface, soft, easily sectioned, uniform in color and consistency.

Sections not darkening in KOH solution, darkening in Melzer's reagent; generative hyphae of subiculum difficult to discern, thin-walled, nodose-septate, 2–3.5 μ in diam (fig. 1a) giving rise to the dichohyphidia and gloeocystidia which are the conspicuous elements of the subiculum; gloeocystidia abundant, imbedded in subiculum and projecting from hymenial region, staining deeply in phloxine and also strongly positive in sulfobenzaldehyde reagent, spherical to elongated, up to 10 μ in diam,

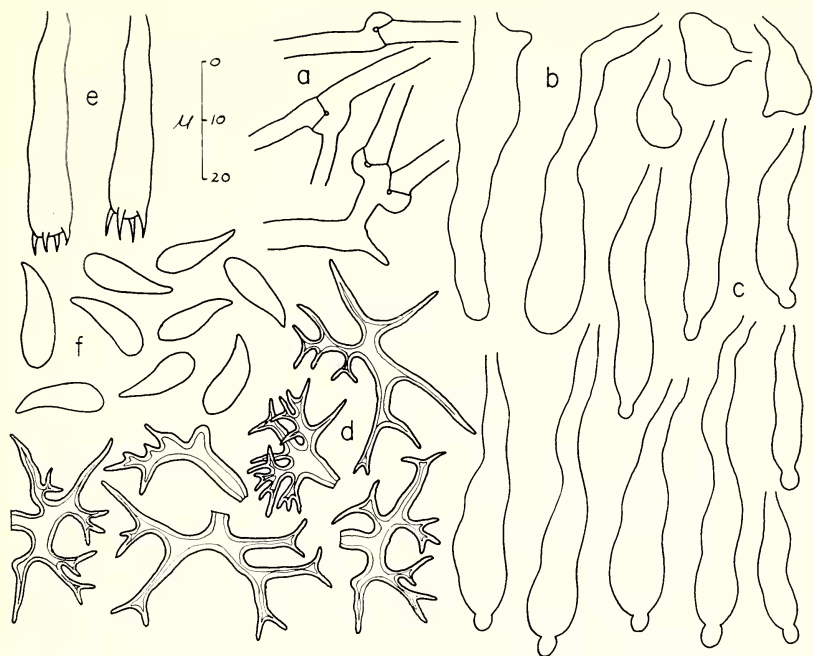


FIG. 1. Microscopic characters of basidiocarps of *V. athabascensis*: a, thin-walled, nodose-septate subicular hyphae; b, irregularly shaped, imbedded gloeocystidia; c, elongated, mammillate gloeocystidia from hymenial region; d, dichohyphidia; e, basidia; f, basidiospores (type).

but usually 3–5 μ in diam, often mammillate (fig. 1b, c); dichohyphidia abundant, strongly dextrinoid in Melzer's reagent, especially in the hymenial region, thick-walled, aseptate, main branches up to 3 μ in diam, some branches long, slender, and unbranched (fig. 1d); hymenial structures forming a typical catahymenium, with basidia developing in the mass of dichohyphidia, apparently from spherical probasidia, becoming elongated, cylindric to narrowly clavate with slight constrictions, swollen at the base, 4-sterigmate, 6–6.5 μ in diam, 30–40 μ long (fig. 1e); basidiospores hyaline, smooth, nonamyloid, attenuated at the basal end and appearing tear-shaped, 11–16 μ long, 3–5 μ wide at the distal end (fig. 1f).

Specimens examined. ALBERTA: Grizzly Creek, near Athabasca River, on *P. contorta*, Gilbertson 6504, 6515, July 30, 1966. ARIZONA: Mt. Lemmon, Santa Catalina Mtns., Coronado Nat. Forest, Pima Co., on *Populus tremuloides* Michx. (quaking aspen), Gilbertson 7135, Aug. 16, 1967.

Other species of *Vararia* known from the Rocky Mountains are *V. investiens* (Schw.) Karst., *V. racemosa* (Burt) Rogers and Jackson, and *V. granulosa* (Fries) M. Laur. The growth habit of *V. athabascensis*

is similar to that of *V. investiens*, both fruiting on small twigs and branches in the litter as well as on larger branches and logs on the ground. *Vararia investiens* differs in having more slender and abundant dichohyphidia, spores that taper toward both ends, and lacks the sulfo-benzaldehyde-positive gloeocystidia. *Vararia granulosa* differs in its amyloid spores, less conspicuous gloeocystidia, and larger dichohyphidia. *Vararia racemosa* has small clusters of densely branched dichohyphidia, cylindric spores, and broad, mucronate gloeocystidia that are not positive in sulfo-benzaldehyde reagent. Welden (1965) and Gilbertson (1965) give complete descriptions and illustrations of these three species. Another species, *Scytinostroma praestans* (Jacks.) Donk, has spores and cystidia very similar to those of *V. athabascensis*, but has dendrohyphidia typical of the genus *Scytinostroma* (Jackson, 1948). *Scytinostroma praestans* also is present in the lodgepole pine stands along the Athabasca River (Gilbertson 6511) and resembles *V. athabascensis* very closely macroscopically. The presence of *V. athabascensis* in widely separated stations in Alberta and Arizona indicates its probable occurrence in the Rocky Mountains between those areas.

The decay associated with basidiocarps of *V. athabascensis* is of the white rot type with a pale orange discoloration in the early stages. The positive oxidase reaction of cultures on gallic and tannic acid media and with gum guaiac support of the field observations of a white rot.

Cultures were obtained from freshly collected basidiocarps by suspending small pieces over the slant surface of 2% Difco malt extract agar medium in a culture tube. Spore prints were transferred to sterile tubes as soon as they become discernible. Cultures from which descriptive data were taken were grown on 2% Difco malt extract agar medium in the dark at 25 C. Gallic and tannic acid media (Davidson, et al, 1938) and gum guaiac solution (Nobles, 1958) were used to test for the presence of extracellular oxidases. Cultures examined: Gilbertson 6504 and 6515 previously listed.

Growth characters: Growth slow, radial growth 40–50 mm in 17 days; mat white, appressed, with short, radially appressed fibrils, rather uniform over entire surface in 17 days, with some faint radial zones of sparser aerial mycelium; margin not differentiated, even to slightly bayed; cottony aerial mycelium developing around and over original inoculum after 17 days, this mycelium with a faint pinkish tint; no distinctive odor; no reverse discoloration on malt agar medium; oxidase reactions strongly positive with gum guaiac solution and on both gallic and tannic acid media within 48 hours, no growth on either acid medium.

Microscopic characters: hyphae of advancing zone staining with phloxine, thin-walled, with conspicuous clamp connections, 2.5–6 μ in diam (fig. 2a), giving rise to branches which may become contorted or much-branched (fig. 2b), frequently branching just behind the transverse septum of the clamp, commonly with constrictions, these non-staining (fig.

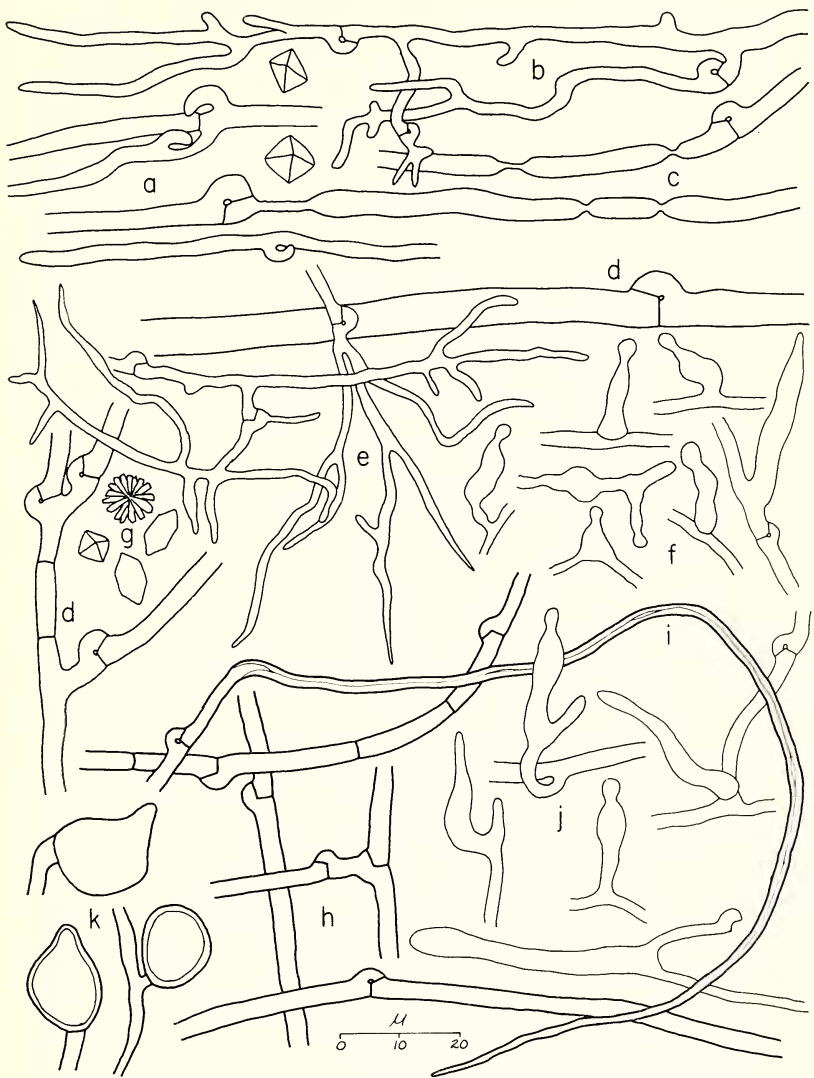


FIG. 2. Microscopic characters of cultures of *V. athabascensis*: a, hyphae from advancing zone; b, much-branched hypha from advancing zone; c, hyphae from advancing zone with constrictions; d, large, unbranched hyphae from submerged mycelium; e, much-branched, slender hypha from submerged mycelium; f, gloeocystidia from submerged mycelium; g, crystals associated with submerged mycelium; h, thin-walled hyphae from aerial mycelium; i, slender, thick-walled fiber hypha from aerial mycelium; j, gloeocystidia from aerial mycelium; k, vesicular bodies found in submerged and aerial mycelium after 6 weeks (Gilbertson 6504).

2c); cordons formed from several intertwined hyphae also frequent; hyphae of submerged mycelium thin-walled, staining, with conspicuous clamp connections and also some secondary septa, some extending long distances with little or no branching, $2.5\text{--}6\ \mu$ in diam (fig. 2d), others branching frequently, often just behind the transverse septum of a clamp, eventually giving rise to profusely branched complexes of very slender and flexuous hyphae tapering down to less than $1\ \text{mm}$ in diam (fig. 2e); some hyphae giving rise to gloeocystidia similar to those seen in the basidiocarp, these often mammillate, highly refractive and varying greatly in size (fig. 2f); crystals small plate-like hexagons, rhomboids, or druse-like clusters (fig. 2g); aerial mycelium with thin-walled hyphae, these with conspicuous clamp connections and some secondary septa (fig. 2h), giving rise to fiber hyphae not seen in submerged mycelium or advancing zone, these hyaline, thick-walled, non-staining in phloxine, aseptate, $1\text{--}2\ \mu$ in diam, tapering to a very slender tip (fig. 2i), generative hyphae also giving rise to gloeocystidial hyphae and gloeocystidia as seen in submerged mycelium, these highly refractive in KOH and phloxine and positive in sulfobenzaldehyde reagent (fig. 2j), generative hyphae also giving rise to much-branched hyphae as in other areas; after 6 weeks large, globose or elongated, thin-walled to moderately thick-walled, hyaline vesicular bodies develop in submerged and aerial mycelium, these up to $15\ \mu$ in diam (fig. 2k).

According to the key system proposed by Nobles (1965) the key pattern for cultures of *V. athabascensis* would be 2.3.8.15.36.38.44.55. Using the system proposed by Davidson, et al. (1942), one finds the key pattern to be E-P-S-1-11-16.

Cultures of *V. athabascensis* in petri plates eventually develop areas of brownish mycelium around the periphery of the plates. This brownish mycelium contains abundant slender fiber hyphae as described above in addition to other types of hyphae typical of the aerial mycelium. No dichohyphidia were found in this brownish mycelium and no dextrinoid reactions were observed. No fruiting structures developed in any of the plates or tubes under study. Older cultures also showed secondary septa to be frequent in thin-walled aerial hyphae. The distinguishing characters of *V. athabascensis* in culture are the cottony pinkish aerial mycelium and the conspicuous gloeocystidia.

Duplicates from all collections cited have been deposited in the National Fungus Collections, Beltsville, Md., and the Canadian National Herbarium, Ottawa. Capitalized color names are based on Ridgway (1912).

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REVIEW

Plants of the Oregon Coastal Dunes. By ALFRED M. WIEDEMANN, LA REA J. DENNIS, and FRANK H. SMITH. 117 pp., illus. O.S.U. Book Stores, Inc., Corvallis, Oregon, 1969. \$1.95.

In recent years there has been an increasing variety of inexpensive popular books that deal with the plants in various regions or habitats of the Pacific coast states. The present book is concerned with plants of the Oregon coastal sand dunes and with some of the climatic and geological features of these dunes. It is directed at "the visitor to the sand dunes, regardless of his background." The coastal sand dunes of Oregon are perhaps the best developed of those of any of the Pacific coast states and support an interesting flora that attracts the attention of ordinary vacationers as well as more experienced natural historians. The first portion of this attractive little book is concerned with the physical setting of coastal dunes and their vegetational history. Subsequent chapters deal with plant communities and succession and the use of plants for stabilizing dunes. The final chapters present a key to about 90 characteristic dune plants and descriptions and black and white photographic illustrations of half of these plants. The quality of the photographs generally is good, although some of them—such as those of *Rumex maritima* var. *jueginus*, *Cakile edentula* var. *californica*, and *Lonicera involucrata*—are not as informative as they might be. The level of accuracy is high and the format is a pleasing one, although I suspect that the level of presentation is somewhat too high for the average citizen.

This book might be considered superfluous to P. A. Munz's *Shore Wildflowers of California, Oregon and Washington* issued by the University of California Press in 1964. However, I think that because of its extensive discussion of the ecology of coastal dunes and its low price, the Wiedemann, Dennis, and Smith volume should be considered as a complementary volume—if not a replacement in Oregon—for the Munz book.—ROBERT ORNDUFF, University of California, Berkeley.